

Original Research Article

Comparative study of fine needle aspiration cytology and histopathology of thyroid swellings in tertiary health centre

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ABSTRACT

Background: Thyroid swelling being the most common presentation in ENT clinical practice, a prospective study was done to assess the role of Fine needle aspiration cytology in diagnosing the nature of thyroid swellings and comparing its results with histopathological examination findings.

Methods: This is a prospective institutional based study comparing cytology and corresponding histopathology findings reported in 60 cases of thyroid swelling. The statistical analysis included sensitivity, specificity, positive predictive value, negative predictive value and accuracy in thyroid swelling.

Results: Out of 60 cases, FNAC showed 93.3% and 6.6% of benign and malignant cases respectively whereas HPE showed 86.7% and 13.3% of benign and malignant cases respectively. On FNAC-HPE correlation using HPE as standard reference the diagnostic accuracy of present study is 91.66%.

Conclusions: It was observed that FNAC is a reliable tool, safe and accurate method in evaluating thyroid swelling thus having great influences in treatment decision. Thus FNAC is the investigation of choice in thyroid swellings with excellent patient compliance, simple, safe and cost effective.

Keywords: Thyroid swelling, FNAC, Accuracy, Sensitivity, Specificity

INTRODUCTION

Overall thyroid swellings incidence worldwide is 4-10 % in adults and 0.2-1.2% in children. Benign swellings are more common, few being malignant.¹ Thus emphasis is placed upon finding diagnostic modalities that may improve the ability to differentiate between the benign and malignant lesions. For appropriate evaluation and management of thyroid swelling clinically applicable and cost effective approach is needed, so as to come out with proper diagnosis and timely management of disease.

FNAC is the single most primary investigation which is safely and widely recommended pre operatively. It is sensitive, specific, cost effective, readily available and

easy to perform. It is a branch of the diagnostic cytology that interprets the changes in the cells extracted from within the organs, tumours or non-neoplastic abnormal tissues. It is a crucial diagnostic test in evaluating the patient with thyroid nodule which determines whether patient is followed clinically or referred for surgery.

Aim and objectives

Aim and objectives of current study were; to correlate the cytological and histopathological diagnosis of thyroid swellings and to determine role of FNAC in diagnosis and management of thyroid swellings.

METHODS

This a prospective study of 60 patients was selected randomly who presented with thyroid swelling to department of ENT in tertiary health centre during study period of 18 months from December 2018. After admission detailed history and thorough clinical examination was carried and was entered in proforma. All the patients underwent FNAC preoperatively. These patients underwent surgery and excised specimen was sent for HPE. The diagnostic accuracy of FNAC findings were compared with HPE findings.

Inclusion criteria

All adult male and female patients with clinically palpable thyroid swellings were included in the study.

Exclusion criteria

All cases of thyroid swellings with abnormal thyroid hormone profile, all cases of thyroiditis are excluded; all patients who do not give consent for FNAC, all patients with co-morbidities and unfit for surgery and all patients who refuse surgery were excluded from the study.

Procedure

After obtaining consent from the patient FNAC of thyroid swellings was done on OPD basis in our hospital in the department of pathology. FNAC was done as per standard guidelines (Figure 1). The 3 smear slides were immediately fixed with 95% ethyl alcohol by immersion of smear slides in fixative for Papanicolaou staining and 1 smear slide was air dried and then stained with May-Grunwald Giemsa stain. Cytological diagnosis given by cytopathologist was based on “the Bethesda system for reporting thyroid cytopathology (TBSRTC)” reporting system.

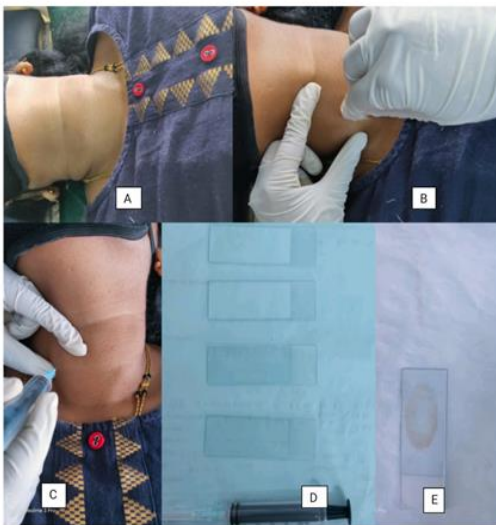


Figure 1: Fine needle aspiration procedure.

A-position of the patient during the procedure, B-nodule identified, fixed and cleaned with spirit swab, C-needle inserted and aspirated, D-smear slides arranged in row, E-smear prepared and fixed. The patients were subjected for surgery based on side and extent of lesion involving the thyroid gland. After the surgical excision done the specimen was stored in 10% formalin container and sent to department of pathology for histopathological examination. The specimen subjected to immersion chemical fixation method and fixation was done using 10% formalin. Tissue sections after staining on glass slides were evaluated and documented. For statistical analysis of the study numerical data was entered in table and calculated.

RESULTS

The present study included total of 60 patients in a period of 18 months who underwent surgery in tertiary health center. In the present study majority of the patients belonged to age group 21-30 years. The sex ratio is 1:5 with female preponderance (Table 1). The lesions found in the present study during FNAC procedure were broadly classified and reported based on Bethesda cytological reporting system. Out of 60 cases, none of the cases were found in category 1, 53 cases belonged to category 2 (88.4%), 1 case belonged to category 3 (1.7%), 2 cases belonged to category 4 (3.3%), 2 cases belonged to category 5 (3.3%) and 2 cases belonged to category 6 (3.3%) (Table 2).

Bethesda reporting system

Out of 60 cases, majority of lesions were diagnosed as benign lesions i.e. 56 cases (93.3%), out of which 48 cases (80%) showed benign follicular lesions which included colloid goitre (17 cases), nodular goitre (29 cases) and adenomatoid goiter (2 cases).

Total 5 cases showed colloid cystic content lesions (8.4%). 3 cases showed follicular neoplasm features (5%) out of which 1 case had atypia features of follicular neoplasm and 2 cases had consistent benign follicular neoplasm features. Out of 4 malignant lesions, 2 cases (3.3%) showed suspicious of malignancy (papillary carcinoma) and 2 cases showed malignant features of papillary carcinoma (3.3%) (Table 3).

On Histopathological examination out 60 cases, 40 cases were benign follicular lesions (86.7%) which included 7 cases of nodular colloid goiter, 1 case of nodular goitre, 4 cases of nodular colloid goitre with adenomatous hyperplasia, 7 cases of nodular hyperplasia, 9 cases of colloid goitre with secondary changes, 3 cases of adenomatous goitre and 9 cases of multinodular goitre. 3 cases had features of colloid cyst (5%). 5 cases had features of follicular adenoma (8.3%). Out of 4 thyroiditis cases (6.7%), 2 cases showed features of nodular colloid goitre with hashimoto's thyroiditis, 1 case showed features of lymphocytic thyroiditis and 1 case showed

features of hashimoto's thyroiditis. Out of 8 cases of malignant lesions (13.3%), 4 cases were of papillary thyroid carcinoma of conventional type, 2 cases were papillary carcinoma of follicular variant, 1 case of papillary carcinoma of oncocytic variant and 1 case of papillary carcinoma of extensive cystic degeneration (Table 4). On comparison of results of FNAC with histopathology, out of 60 cases 46 cases were found to have similar diagnosis on both FNAC and histopathological examination. It included 38 cases of benign follicular lesion, 3 cases of colloid cystic lesion, 1 case of follicular adenoma and 4 cases of malignant lesions. Out of these 4 malignant lesions, 2 cases were suspicious of malignancy and 2 cases had features of malignancy which were considered under malignant lesions (Table 5). In remaining 14 cases variations in diagnosis were seen on comparison (Table 6). Using HPE results as standard reference the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy of FNAC was calculated.

On comparison between FNAC and HPE findings, it was found that out 60 cases 51 cases had benign features in both FNAC and HPE. 4 cases showed malignant features in both FNAC and HPE. In 4 cases which had benign features in FNAC were diagnosed as malignant lesions in HPE. 1 case which was diagnosed as malignant lesion in FNAC was diagnosed as benign lesion in HPE (Table 7). In present study sensitivity is 50% i.e. out of 8 cases of malignant lesions FNAC was able to diagnose 4 cases of malignancy, specificity is 98.07% i.e. out of 52 cases of benign lesions FNAC was able to diagnose 51 cases of benign lesions, diagnostic accuracy is 91.66% i.e. out of 60 cases tested FNAC could diagnose 4 malignant lesions and 51 benign lesions correctly. In present study out 5 cases which was diagnosed as malignant in FNAC, only 4 cases were diagnosed as malignant according to HPE. Therefore, probability of having malignant disease following positive FNAC results for malignancy i.e. PPV is 80% and out of 55 cases which was diagnosed as benign in FNAC, only 51 cases were diagnosed as benign according to HPE. Therefore, probability of not having malignant disease following negative FNAC results for malignancy i.e. NPV is 92.72% (Figure 2).

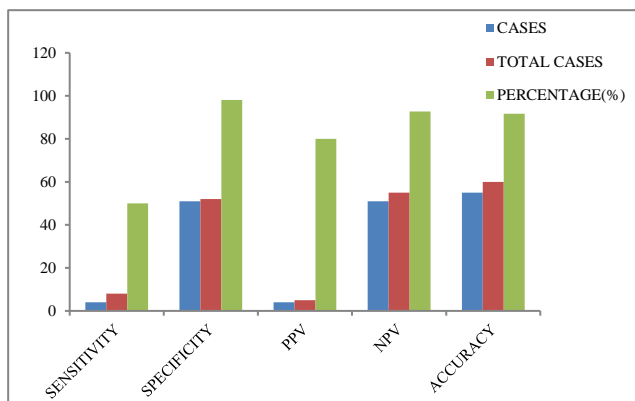


Figure 2: Statistical values of FNAC-HPE.

DISCUSSION

Out of 60 cases, majority of lesions were diagnosed as benign lesions i.e. 56 cases (93.3%) and 4 malignant lesions (6.6%). The present study when compared with studies results was comparable with studies conducted by Kumar et al and Mangshetty et al with marginal variation.

The present study showed sensitivity of 50%, specificity of 98.07%, positive predictive value of 80%, negative predictive value of 92.72% and diagnostic accuracy of present study of 91.66% (Table 8). On comparison with other studies the present study showed sensitivity of 50% which is nearly in approximation of study conducted by Pandey et al and highest sensitivity reported in the studies mentioned was in a study conducted by Mahar et al showing 98%. The present study showed specificity of 98.07% which was comparable with study conducted by Sharma et al and highest specificity reported in the studies mentioned was in a study conducted by Mangshetty et al showing 100%. The present study showed PPV of 80% which is nearly in approximation of study conducted by Hajmanoochehri et al and highest PPV was reported in study conducted by Mangshetty et al showing 100%. The present study showed NPV of 92.72% which is nearly in approximation of study conducted by Mahar et al and highest NPV was reported in study conducted by Sharma et al showing 98.6%. The present study showed accuracy of 91.66% which was comparable with study conducted by Mahar et al and Agarwal et al. The highest accuracy was reported in study conducted by Mangshetty et al showing 97.56%.

CONCLUSION

FNAC is a simple, safe and cost effective diagnostic modality in the diagnosis of thyroid swelling with high accuracy being 91.66% in present study. Thus, diagnostic accuracy of FNAC being so high it is reliable investigating tool for screening or diagnosis of thyroid swelling.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Kumar A, Rout K, Ray CS, Behera SK, Biswal R. A Comparative Study of FNAC and Histopathology of Thyroid Swellings. *Indian J Otolaryngol Head Neck Surg.* 2011;63(4):370-2.
2. Sengupta A, Pal R, Kar S, Zaman FA, Basu M, Pal S. Clinico-pathological correlates of incidentally revealed thyroid swelling in Bihar, India. *J Pharm Bioallied Sci.* 2012;4(1):51-5.
3. Mangshetty SS, Jewargikar R. Fine needle aspiration cytology of 220 thyroid lesions histopathological correlation. *Int J Res Health Sci.* 2014;2(1):243-53.

4. Agarwal K, Puri V, Singh S. Critical appraisal of FNAC in the diagnosis of primary papillary carcinoma arising in thyroglossal cyst; a case report with review of literature on FNAC and its diagnostic pitfalls. *J cyto.* 2010;27:22-5.
5. Mahar SA, Hussain A, Islam N. Fine needle aspiration cytology of thyroid nodule: diagnostic accuracy and pitfalls. *J Ayub Med Coll Abbottabad.* 2006;18(4):26-9.
6. Pandey P, Dixit A, Mahajan NC. Fine needle aspiration of the thyroid: a cytohistologic correlation with critical evaluation of discordant cases. *Thyroid research and practice.* 2012;9:32-9.
7. Sharma C. Diagnostic accuracy of fine needle aspiration cytology of thyroid and evaluation of discordant cases. *J Egypt Nat Cancer Inst.* 2015; 27(3):147-53.
8. Hajmanoochehri F, Rabiee E. FNAC accuracy in diagnosis of thyroid neoplasms considering all diagnostic categories of the Bethesda reporting system: A single-institute experience. *J Cytol.* 2015; 32(4):238-43.
9. Shukla S, Tiwari SK. Clinicopathological evaluation of thyroid swelling in patient attending Hamidia Hospital Bhopal. *Int Surg.* 2020;7:2222-5.

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